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### Community Attitude towards Urban Green-Blue Space and Perceived Cultural Ecosystem Benefits: A Preliminary Study at Taiping Lake Garden, Perak, Malaysia

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#### Abstract

Few studies have identified the cultural ecosystem benefits conferred to urban community by green and blue spaces. Attitude towards green-blue space were also studied. However, little attention is given to perceived benefits and attitude components in ecosystem service research. This paper aims to examine community attitudes towards urban green-blue spaces and its association with perceived benefits based on cultural ecosystem services concept. A questionnaire was conducted among 31 respondents of local community at Taiping Lake Garden, Perak. The data were analyzed using Statistical Package for the Social Science (SPSS) which involving multiple regression to capture the effects of attitude components on perceived benefits. The findings suggest that overall attitudes of respondents had an excellent level of perceived attitudes toward urban green-blue space. However, among three sub-construct of attitudes, only cognitive attitude was found to be the dominant variable compared to conative and affective attitude that predicts perceived cultural ecosystem benefits. This indicates that if the community could enhance their positive attitudes toward their urban green-blue space, they may perceive higher cultural ecosystem benefits. Future research should continue to explore ways of enhancing positive attitudes among urban community as attitude may guide them to enhance their engagement in urban green-blue spaces.

**Keywords:** community attitudes, cultural ecosystem services, green-blue space, sustainable cities and communities, sustainability

#### Introduction

Urbanization is growing all over the world, and urban green spaces are becoming crucial to human well-being as well as increasing the opportunity for recreation (Gunnarsson et al., 2017; Liordos et al., 2020). Several studies have shown that urban green spaces (UGSs) provide human beings with a number of environmental and social benefits, including improvements in mental health, increased physical activity, increasing social interactions, improving the environment as well as increases in property value (Fengdi, 2020; Winter et al., 2020). According to Lee and Kim (2015), the main focus of international efforts is always on man-made and built components of urban environment to achieve a sustainable cities and communities. However, less attention has been focused on the combination of green and blue space in urban areas. Green space term (e.g. parks, gardens) has been the focus of environmental research longer than blue space (Dzhambov et al., 2018) while the attention in blue space, defined as an accessible outdoor environment with prominent water features has been gaining momentum in recent years (Grellier et al., 2017).

Green and blue spaces do not only improve the urban ecosystem but also provide multiple cultural ecosystem services (CES) to local communities (Mao et al., 2020; Zheng et al., 2020). Experiences with natural surroundings through visits to green-blue spaces provide important cultural ecosystem services that have the potential to strengthen pro-environmental attitudes and behaviour (Martinez-Harms et al., 2018). Similarly, Lagbas (2019) has demonstrated that pro-environmental decision was significantly influenced by attitudes and other socio-economic factors. Although several studies have been done on attitude and environmental aspects such as the relationship between attitudes toward river ecosystem services (Khan et al., 2019); urban green spaces (Balram & Dragićević, 2005); natural resources management (Cobbinah, 2015); place identity for ecosystem services (Faccioli et al., 2020); urban greenery (Abass et al., 2019); and urban forest ecosystem services management (Baur et al., 2016), but little attention is given to the individual attitude components namely, cognitive, affective and conative in ecosystem service research. To gain a fuller understanding of the relationship between attitude components and perceived cultural ecosystem benefits, a study is required. Focusing on attitude components towards urban green-blue space can help in providing information for setting the future direction or urban sustainability to maximize quality of life among urban community (Lee & Kim, 2015). Therefore, this preliminary study aims to find out the effect of individual attitude components towards urban green-blue space among communities and their perceived cultural ecosystem benefits.

## Literature Review

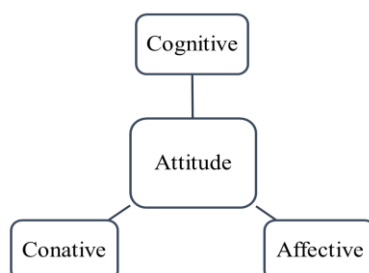
### *Attitudes toward Urban Green-Blue Spaces*

According to Chowdhury and Salam (2015), attitude is the way of thinking and feeling about someone or something, a way of thinking that influences the behaviour of a person, and a way of thinking and acting that people consider being unfriendly, rude, etc. Gunnarsson et al. (2017) revealed that environment-related attitudes influence perceptions of green space. Thus, it is important to improve environmental physical factors in to encourage personal attitudes towards green spaces (Fumagalli et al., 2020). Moreover, it seems to be really important to develop an environmentally friendly attitude at an early age in an urbanised environment (Wójcik, 2017). Assessing individual perceptions and attitudes towards urban green spaces has been rarely covered in the environment literature (Abasolo et al., 2008). Until now, most studies on attitudes toward urban green or blue spaces focus on urban residential trees and awareness of their ecosystem services (Olivero-Lora et al., 2020), urban greenery (Abass et al., 2019), urban forest management (Baur et al., 2020), nature and green space use (Schindler et al., 2018; Sefcik et al., 2019) or attitude toward wildlife (Hosaka et al., 2017). Little is known about the relationship between attitudes and perceived cultural ecosystem benefits.

### *Tri-component Attitude Model*

This study uses the tri-component attitude model (cognitive-affective-conative) to investigate the relationship with perceived cultural ecosystem benefits. This model was developed by Rosenberg and Hovland (1960) to describes the ultimate effect of various external stimuli on the behaviour and attitude of individuals. The tri-component attitude model (Figure 1) stipulates that attitudes comprise of three main components, namely cognitive, affective and conative (Makanyeza, 2014).

Figure 1: The Tri-Component Attitude Model (Rosenberg & Hovland, 1960)



The first part of the model is cognitive attitude. This component is consist of information and perceptions that are found through a combination of experiences with the attitude objects (Chowdhury & Salam, 2015). According to Ariffin et al. (2020), the cognitive component also refers to knowledge, facts, beliefs, assumptions about the object. Human beings have a direct and strong relationship with their environments; thus, this shows that they set their knowledge and beliefs based on their understandings or perceptions of surroundings (Divandari et al., 2016). Moreover, Muller et al. (2019) suggest that environmental knowledge increase the likelihood that people engage in pro-environmental behaviour (conative).

The affective component consist of individual's feelings or emotions regarding the attitude object (Chowdhury & Salam, 2015; Makanyeza, 2014). Affect also is an individual's subjective perception of positive or negative feelings of attitude tendency generated by interactions with surroundings (Ortiz et al., 2017). Wyles et al. (2019) in their study suggests that exposure to natural environment can greatly improve an individual's sense of connectedness e.g. cognitive and emotional bond to the nature and also contribute to cultural ecosystem benefits such as feeling relaxed and refreshed.

The conative component is also known as behavioural intention which people have a tendency to act towards a particular object (Chowdhury & Salam, 2015). Conation may also refer to the behaviour intention (Schiffman & Kanuk, 2004). Yen et al. (2017) found out that behavioural intention to the use of urban green spaces was not significantly associated with the individual's attitude. However, in this study, conative component is also taken as one of the variables to predict whether it will influence community's perceived benefits or not.

### ***Cultural Ecosystem Services***

Cultural ecosystem services (CES) is defined within a wider ecosystem service framework as non-material and intangible benefits that people obtain from ecosystem from aesthetic and other experiences, recreation, learning and spiritual enrichment or sense of place (MEA, 2005; Rózová et al., 2020). In order to maximize people's CES benefits, it may be important for fostering an active interest in nature, leading people to participate or seek knowledge and understanding, and in turn build a stronger sense of nature-relatedness (McGinlay et al., 2018). However, cultural ecosystem services are often neglected and are difficult to measure due to their invisibility (Zhao et al., 2018). Cultural ecosystem services only come into existence through people perception of the ecosystem, and are dependent on people consciousness, their knowledge, social and cultural development than other ecosystem services and not from the ecosystem itself (Buchel & Frantzeskaki, 2015; Daniel et al., 2012). Understandably, research into the less tangible aspects of human interaction with the natural environment has lagged (Dickinson & Hobbs, 2017). While there are definitely challenges, studies have shown that it is possible to explore CES. Thus, in this study, we try to examine is there any association between attitude components with perceived benefits based on cultural ecosystem services framework, namely health and recreation, aesthetic, inspiration, spiritual benefits, social interaction, education and nature exploration, sense of place, cultural heritage.

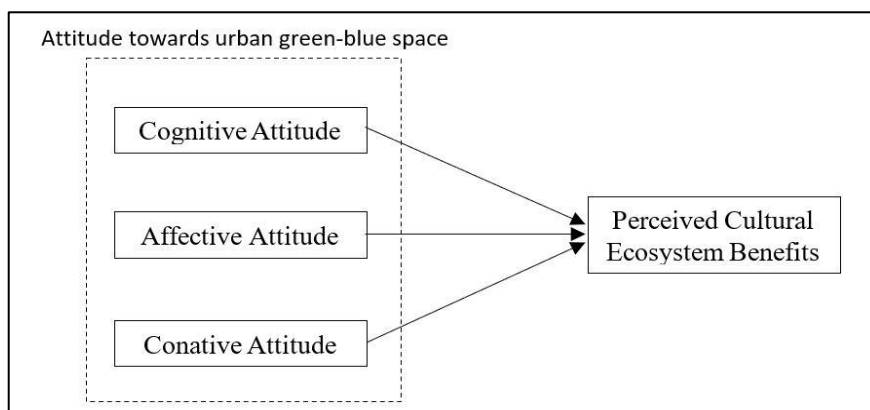
### ***Research Model and Hypotheses***

The main purpose of this research is to investigate community attitudes toward urban green blue space and their perceived cultural ecosystem benefits. In order to achieve this, a tri-component attitude model which has been developed by Rosenberg & Hovland (1960) was used to predict perceived cultural ecosystem benefits based on cultural ecosystem services framework which has been developed by MEA (2005). In accordance with the objectives, the conceptual frameworks consist of attitude constructs (cognitive, affective, conative), cultural ecosystem services concept (health and recreation, aesthetic, inspiration, spiritual benefits, social interaction, education and nature exploration, sense of place, cultural heritage) and socio-demographic attributes (age, education, monthly income, residential type, frequency of visits, time spent per visits). In this study, the dependent variable in the model is perceived cultural ecosystem benefits while the other variables e.g. community attitudes and socio-

demographic attributes were taken as independent variables. Thus, based on the model (Figure 2) and purpose of the research, its hypotheses are raised as follows:

- H1: Community have an excellent attitude towards their green-blue space
- H2: Cognitive, affective and conative components are internally correlated with each other.
- H3: Cognitive, affective and conative components are positively correlated with perceived cultural ecosystem benefits.

Figure 2: Research model

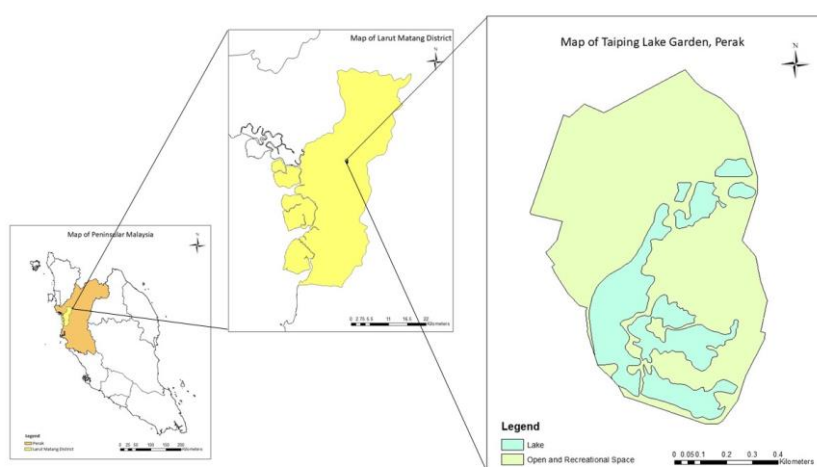


## Methodology

### Study Area

Taiping Lake Garden (coordinates of 4°51'18.99" N 100° 44'52.09" E) is located at the northern Perak, Malaysia and covers 64 hectares, filled with 2,300 trees and the unique sight of the drooping branches of the 100 years old trees (Thani et al., 2015). It was the first public garden established during the British rule in Malaysia and it was formerly a tin mine. Now, Taiping Lake Garden serves as Environmentally Sensitive Areas that is focusing more on recreation as well as a cooling agent (green lungs) to Taiping city. Taiping Lake Garden receives natural water supply from land drains or streams that flow directly into the lake at Alamanda Pond and Island Pond. There are almost 10 lakes and small ponds making Taiping Lake Park one of the main attractions in Perak due to the biodiversity, not only for locals to enjoy, but also to attract local and foreign tourists.

Figure 3: Map of Study Area (Taiping Lake Garden, Perak)



## Questionnaire Survey and Sampling Method

The preliminary study adopts a quantitative approach using a survey questionnaire to analyse the community who visits Taiping Lake Garden for their recreational activities during the month of December 2019. A random sampling, compromising 31 respondents was chosen for the questionnaire survey as a pilot, regardless of social status and ethnic-racial backgrounds. The questionnaire was divided into three parts; the first part had questions on demographic characteristics, such as age, education, monthly income, residential type, frequency of visits and time spent per visits (six closed-ended items), the second part compromised 12 items (using five-point categorical Likert scale) on community attitudes towards Taiping Lake Garden which was developed by Rosenberg & Hovland (1960) and the third part consist of 26 items (using five-point categorical Likert scale) for cultural ecosystem benefits (MEA, 2005). All three variables were constructed based on the literature review. The Likert scale ranged from “strongly disagree (1)” to “strongly agree (5)”.

## Statistical Analysis

The data collected from the respondents’ answers were statistically analysed using the IBM Statistical Package for Social Science (SPSS) statistical software version 24. The analysis was accomplished using the multiple regression and path analysis to capture the relationship of attitude components on perceived benefits by the community. Path analysis is an extension of multiple regression analysis which provides estimates of the indirect effects of such variables on the other variables specified in the model (Peng et al., 2019; Walker et al., 2008). Further, we believe that, to perceive higher benefits from the urban green-blue space, individuals need to have a positive attitude towards the environment. Besides, the Likert scale scores were also interpreted to determine the level of community attitudes towards Taiping Lake Garden.

## Result

### Socio-demographic Profiles

Table 1 gives a summary of the demographic profile of the respondents. The data was collected from a total of 31 visitors at Taiping Lake Garden as part of a preliminary study. The respondents are mainly females and only around 29.0% are males. The highest number of respondents comprises 10 respondents (32.3%) aged between 18-30 years old followed by 29.0% respondents who are less than 18 years old and around 12.9% of them are more than 50 years old. Majority of the respondents has at least graduated from secondary school (58.1%) followed by 25.8% having at least a diploma or STPM. In terms of the monthly income, majority of the respondents (45.2%) were students with no specific income and most of them live in a single-story terrace house (67.7%). In addition, 58.1% of the respondents spent almost two hours at Taiping Lake Garden for their activities and majority of them (45.2%) visit Taiping Lake Garden only once a month.

Table 1: Demographic profiles

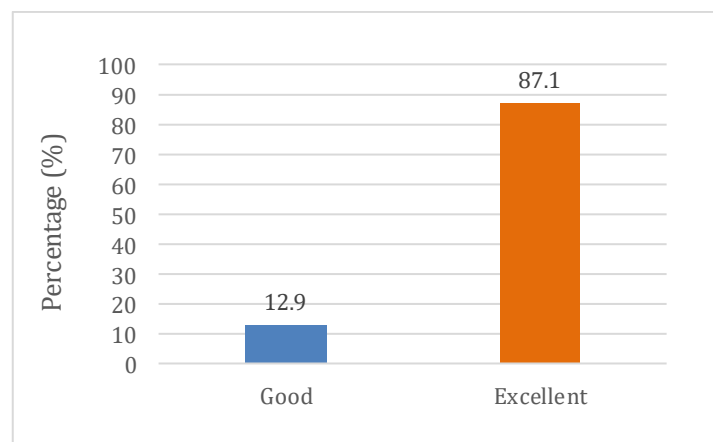
Variable	No. of Respondents (f)	Percentage (%)
<b>Age (years old)</b>		
< 18	9	29.0
18 – 30	10	32.3
31 – 40	5	16.1
41 – 50	3	9.7
> 50	4	12.9
<b>Level of Education</b>		
No formal education	1	3.2
Secondary school	18	58.1
STPM/Diploma	8	25.8

Bachelor's degree	4	12.9
<b>Monthly Income</b>		
No income (student etc)	14	45.2
< RM 1000	1	3.2
< RM 2600 (lower middle)	9	29.0
Between RM 2601 – RM 5200 (upper middle)	6	19.4
> RM 5200	1	3.2
<b>Residential Type</b>		
Single storey terrace house	21	67.7
Flat	4	12.9
Twin House	2	6.5
Bungalow	2	6.5
Others	2	6.6
<b>Time Spent at TLG</b>		
1 hour	3	9.7
2 hours	18	58.1
3 hours	10	32.3
<b>Frequency of Visits</b>		
Everyday	3	9.7
Once a week	5	16.1
More than once a week	4	12.9
Once a month	14	45.2
Others	4	12.9

### *Community's Attitude towards Taiping Lake Garden*

Survey respondents generally had an excellent level of perceived attitudes toward urban green-blue space, specifically at Taiping Lake Garden based on the 12-item Likert scale, with Figure 3 showing the overall level of attitudes score of between 43 and 60 (excellent attitude).

Figure 4: Level of Community's Attitude towards Taiping Lake Garden (Overall)



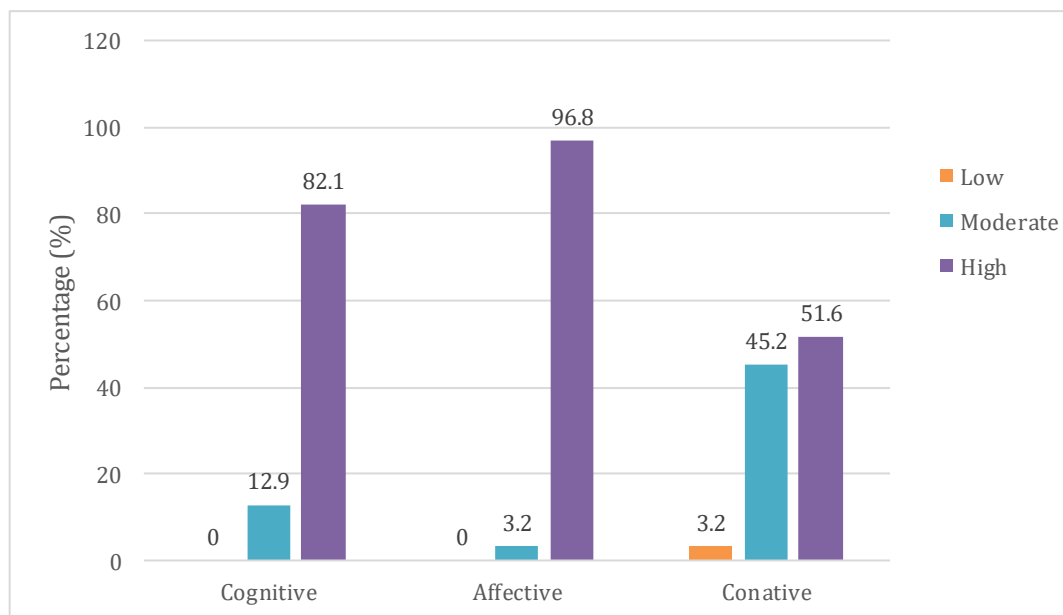
\*Score: Good (24 – 42), Excellent (43 – 60)

As observed in Figure 5, survey respondents generally had a high level of perceived attitudes toward Taiping Lake Garden on two components of attitude, which are cognitive (82.1%) and affective component (96.8%). However, only 51.6% of the respondents had excellent attitude, whereas 45.2% had a good attitude and another 3.2% of respondents has an average attitude. According to Lee et al. (2019), the conative component of attitude is the behavioural intention of any individuals towards a specific activity. This shows that respondents may feel difficult or reluctant to take some action towards their green-blue space, for instance, make a report to the authority if the space is not clean and willing to pay some fees in order for the authority to maintain the green-blue space. From this analysis,



H1 is rejected, which conclude that only cognitive and affective components show an excellent attitude compared to conative component of attitude towards urban green-blue space. This correlation was in line with research conducted by Abun et al. (2019) on attitude of students toward environment and revealed that students' cognitive and affective attitude toward environment is very high.

Figure 5: Level of Community's Attitude towards Taiping Lake Garden (based on three components of attitudes)



\*Score: Average (5 – 9), Good (10 – 15), Excellent (16 – 20)

### Correlation Analysis

Results of correlation analysis are shown in Table 2, which indicates the relationship between cognitive, affective and conative attitude towards urban green-blue space. As seen in Table 2, the correlation coefficients for the variables under investigation were ranging from 0.154 to 0.557. Only cognitive attitude has a positive significant relationship with affective attitude ( $r=0.557$ ,  $n=31$ ,  $p<.01$ ), but there is no significant relationship between cognitive and conative attitude as well as correlation between affective and conative attitude towards urban green-blue space. From this analysis, the results confirm our second hypotheses (H2) is rejected and revealed that only cognitive and affective components are correlated to each other.

Table 2: Correlation Analysis

	Mean	Standard Deviation	Attitude Components		
			Cognitive	Affective	Conative
Cognitive	17.52	1.947	1	0.557*	0.262
Affective	17.90	1.739		1	0.154
Conative	15.29	2.636			1

\*Correlation is significant at the 0.01 level (2-tailed).

### Path Diagram and Regression Analysis

Path analysis was used to identify the degree of relationship between the independent variables (IVs) and dependent variables (DV). One way of conducting path analysis is through a series of multiple regression analysis (Streiner, 2005). Multiple regression coefficients are equivalent to path coefficients

where the standardized  $\beta$  score shows the magnitude of the effects of independent variables on the dependent variable (Alemu & Shea, 2019).

In this study, multiple regression analysis was run to find out whether cognitive, affective and conative attitudes are predictors of perceived cultural ecosystem benefits or not. Three constructs from the attitude components (cognitive, affective, conative) were the IVs and the DV for the regression or path diagram was perceived cultural ecosystem benefits. Table 3 summarizes the DV and IVs of the regression analysis with the corresponding  $R^2$ , standardized  $\beta$  and ANOVA. According to the result, 62.8 percent of the variation in perceived cultural ecosystem benefits can be explained by the relationship to cognitive, affective and conative attitudes ( $R^2 = 0.628$ , Adjusted  $R^2 = 0.587$ ,  $F = 15.205$ ,  $p < .05$ ). Standardized coefficient beta values between cognitive, affective, conative and perceived benefits show that only cognitive ( $\beta = 0.392$ ,  $p < .05$ ) and conative attitude ( $\beta = 0.439$ ,  $p < .05$ ) were significant.

Table 3: Regression Analysis of Path Model

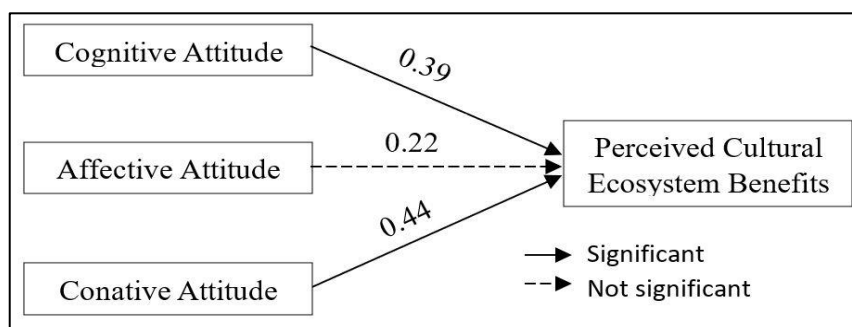
	Coefficients					Model Summary		ANOVA	
	Unstandardized Coefficients		Standardized Coefficients			R-square	Adjusted R-square	F	Sig.
	Beta	Std. Error	Beta	t	Sig.				
Model (Constant)	17.822	15.582		1.144	.263	.628	.587	15.205	.000
Cognitive	2.333	.854	.392	2.733	.011				
Affective	1.490	.946	.223	1.574	.127				
Conative	1.933	.538	.439	3.595	.001				

Dependent Variable: Perceived Cultural Ecosystem Benefits

Figure 5 shows the summarized path diagram (perceived cultural ecosystem benefits model) identified as a result of regression analysis. The results reject our third hypotheses (H3) and revealed that even all three attitude components have direct positive impact on perceived cultural ecosystem benefits, however, only cognitive and conative attitude were statistically significant in this study. Based on these two significant variables, cognitive attitude ( $\beta = 2.333$ ) was found to be the dominant variable compared to conative attitude ( $\beta = 1.933$ ) that predicts perceived cultural ecosystem benefits. This relationship shows that if the community could enhance their positive attitudes especially in terms of thinking, knowledge, beliefs, and action towards their urban green-blue space, they may perceive higher or more cultural ecosystem benefits. Therefore, in this study, the multiple regression model is as follows:

$$Y (\text{perceived cultural ecosystem benefits}) = 17.822 + 2.333(\text{Cognitive}) + 1.933 (\text{Conative})$$

Figure 6: Diagram of path analysis on community's attitude and perceived cultural ecosystem benefits





## Discussion

Attitude towards urban green-blue space is the how you think, believe, act, or feel about the environment such as in urban parks or lake garden. These attitudes are among the most important drivers of pro-environmental behaviour (Prati et al., 2015) as well as can be predictors on what can we perceive from the environment. However, these components of attitudes have received only limited consideration in research related to the ecosystem services especially in cultural part. This study contributes to address this gap by investigating each of the attitude components on perceived cultural ecosystem benefits. This preliminary study found that among all three components of attitude, only two were statistically significant that can predict perceived cultural benefits at Taiping Lake Garden, namely cognitive and conative attitudes.

The cognitive responses are characteristic of rational thinking, beliefs, experience and thoughts (Trandafilović et al., 2013) whereas conative or behavioural attitude is connected to a person's actions in relation to the attitude object (Chowdhury & Salam, 2015). In this study, community shows their thoughts and beliefs on local authority or municipal to manage Taiping Lake Garden as well as they believe that they were also play an important role to help to protect and maintain the cleanliness of the area. This is in line with Gunnarsson et al. (2017) indicating that environmental attitude plays an important role in developing such an attachment to a specific urban green space. In addition, community tended to make the most positive responses or attitudes to the benefits closely related to their life (Chen et al., 2020). Thus, an excellent urban green-blue space management may improve the quality of the space and the community or the visitors can experience or benefits the ecosystem services provided, for example the beauty of the nature as well as to get some fresh air.

Besides, community in the study area are also likely to be more willing to take care of the green-blue space in order to get more intangible benefits from the ecosystem in terms of social interaction, spiritual benefits and inspiration. This shows that conative or behavioural attitude of the community towards urban green and blue spaces may influence their perceived benefits. Few studies have demonstrated the roles behavioural intention towards green and blue spaces. For instance, Chen et al. (2006) have shown that the benefits of green space is strongly connected to the willingness of community to take part in green space conservation. However, even affective component was not statistically significant with the perceived benefits, it is worth noting that community in this study may freely experience emotional or positive feeling without any judgement about other people and tend not to influence what benefits or value they can perceive from the green-blue spaces.

This study provides an insight on the importance of attitude components in the planning, development and management of urban green-blue spaces. The developed attitude instrument focusing on each component (cognitive, affective and conative) provides opportunities for several further research investigations in social integration with ecosystem services and benefits. This study was a preliminary study that focused at community who visits Taiping Lak Garden as respondents. Thus, it is possible to look at non-visitors as respondents because the results may give a different insight about the attitude and perceived benefits. Also, relationship of other factors such as socio-demographic characteristics, knowledge and attitude components can be fused to provide an indication of the perceived benefits from the ecosystem not only focusing on cultural ecosystem services. These factors may plan an important role in shaping positive attitude and contributing to perceived benefits toward urban green-blue space.

## Conclusion

The study presented can only be considered a first step in collecting more comprehensive information on attitude components and cultural ecosystem service research for setting the future direction on sustainable cities and communities. In this preliminary study, we have addressed each of the component in tri-component of attitude model, namely cognitive, affective and conative attitude towards perceived cultural ecosystem benefits, assessed through the analysis of survey questionnaire. The study findings can be summarized as follows. Firstly, urban community have an excellent attitude

towards their green-blue space. Secondly, only cognitive and affective components are correlated to each other. Thirdly, only cognitive and conative components are positively correlated with perceived cultural ecosystem benefits. These findings, thus, show that attitudes toward urban green-blue space and perceived cultural ecosystem benefits may play an important role in enhancing good quality of life. Besides, understanding community's attitude towards green-blue space would allow urban planners and managers for designing successful urban green-blue space management. Future research should also continue to explore ways of enhancing positive attitudes among urban community as each component of attitudes may guide them to enhance their engagement and stewardship in urban green-blue spaces.

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